PATENT SPECIFICATION 906,574

DRAWINGS ATTACHED.

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International Classification :—A61m.

COMPLETE SPECIFICATION.

Injection Instrument.

I, THE FEDERAL MINISTER OF DEFENCE, representing the Federal Republic of Germany, a German Citizen, of Ermekeilstrasse 27, Bonn, Germany, do hereby declare this invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement :

The invention relates to an instrument for carrying out injections, in particular intramuscular injections, and it is the aim of the invention to construct the instrument in such a manner that injections, particularly self-administered injections, can be carried out largely automatically and without any preparatory manipulations.

Injections, in particular self-administered injections, e.g. of atropine solutions or other antitoxins, for example to counteract poisons used in combat, require to be carried out extremely rapidly. The invention is further based on the consideration that it requires a great deal of self-discipline to administer injections to oneself. With laymen and nervous subjects, the fear of inserting a needle is considerable, so that there is the danger that in a case of emergency a life-saving injection would fail to be adminstered in time. For example, the insertion may be carried out with a great deal of hesitation and may be stopped at the first sensation of pain, so that no intramuscular injection will result, but at the most an sub-cutaneous injection or none at all.

The invention therefore proceeds from the idea of making the injection process automatic, so that the difficult decision of inflicting on oneself a deep insertion of the needle is replaced by the much easier decision of placing an automatic injection instrument, preferably with the injection needle hidden.

According to this invention there is provided an instrument for carrying out an injection (preferably intramuscular) with a hypodermic needle supported in a housing opposite to a prepared point of entry, a normally compressed spring device which after release drives the needle outwards through the point of entry, and a compressible container for the injection fluid, arranged between the spring device and the needle, with a prepared point of entry for the other end of the needle, wherein the housing is in one piece and invariable in its linear expansion, the spring device on the one hand being anchored to the housing and on the other hand bearing against one end of the compressible container, and wherein the said one end is normally retained by two diametrically opposed stops, for example sickle-shaped projections, on the inside of the housing, external markings being provided on the outside of the housing substantially at the level of the stops but displaced 90° with respect thereto, whereby compression of the housing at the markings causes the stops to move apart and so release the said end and initiate the injection.

This construction has a number of advantages compared with well known types of automatic injection syringes, namely it is very light in weight ; clean ; may be made of corrosion-resistant material, for example plastic ; of small dimensions ; capable of being refilled ; extremely simple to handle, and low cost of production.

The needle is preferably carried by a conical plug, which under the action of the spring, is capable of limited movement relative to the wall which contains the perforation area leading to the fluid container.

The invention will now be described in

more detail by way of example, with reference to the accompanying drawings, in which :

Figures 1 to 4 show enlarged longitudinal sections through an instrument according to the invention, in various stages of operation ; and

Figure 5 is a diagrammatic perspective view of the outside of the instrument.

Reference 1 indicates a housing which is closed on all sides, 2 indicates a cover, which may either be snapped on or welded to the housing 1. 3 is a retaining ring formed on the cover 2 to hold a spring 4, which spring is similarly retained by a wall 5 of a fluid container 6. An injection needle 9, which projects freely into the cavity of the housing 1, is mounted in an opposite wall 7 of the fluid container by a conical plug 8. 11 indicates a portion of the bottom 10 of the housing which is prepared for perforation, by being made of reduced thickness. The wall 5 is supported by inward projections 13, which may for example be of sickle shape when viewed in side elevation.

Figure 2 shows that when the housing 1 is deformed by being compressed in a direction at right angles to the plane of the paper, the projections 13 move apart so that the fluid container 6, and with it the needle 9, are propelled downwards by the action of the spring, the needle thereby perforating the area 11. As compression continues, as shown in Figure 3, the conical plug 8 enters the recess in the wall 7 so that the inner end of the needle punctures the area 12, thereby establishing a connection with the inside of the fluid container. At that moment injection begins, under the action of the spring. The collapsible fluid container is compressed until, in the position shown in Figure 4, it is emptied.

Finally, Figure 5 shows one of the two external markings on points 14 where pressure can be applied. By pressing at these points, which are displaced 90° from the projections 13, the housing 1 is deformed so that the projections 13 move apart and the automatic injection process is released.

The nature of the injection fluid may be indicated on the cover 2. Brief instructions for use may be printed on the housing 1.

To prevent accidental release of the injection mechanism, the housing may be kept inside a pressure-resistant casing. A suitable plastic material, for example polyethylene, may be used for the housing as well as for the collapsible injection-fluid container. Instead of the sickle-shaped projections described, other kinds of retaining devices may be provided, which may, for example, be released directly when placed on the skin. If desired, the spring 4 may be replaced by an arrangement of several springs, one spring propelling the needle downwards and the other expressing the fluid.

The instrument is suitable for repeated use, particularly for practice purposes. For this purpose, the perforation area may be closed for example by a piece of paper or plastic. Refilling may be by sucking the fluid through the perforation area 12. When refilling completely, it is advisable to replace the fluid container 6 by a new one.

WHAT I CLAIM IS :—

1. An instrument for carrying out an injection (preferably intramuscular) with a hypodermic needle supported in a housing opposite to a prepared point of entry, a normally compressed spring device which after release drives the needle outwards through the point of entry, and a compressible container for the injection fluid, arranged between the spring device and the needle, with a prepared point of entry for the other end of the needle, wherein the housing is in one piece and invariable in its linear expansion, the spring device on the one hand being anchored to the housing and on the other hand bearing against one end of the compressible container and wherein the said one end is normally retained by two diametrically opposed stops, for example sickle-shaped projections, on the inside of the housing, external markings being provided on the outside of the housing, substantially at the level of the stops but displaced 90° with respect thereto, whereby compression of the housing at the markings causes the stops to move apart and so release the said end and initiate the injection.

2. An instrument for carrying out an injection, substantially as herein described with reference to the accompanying drawings.

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Fig. 1

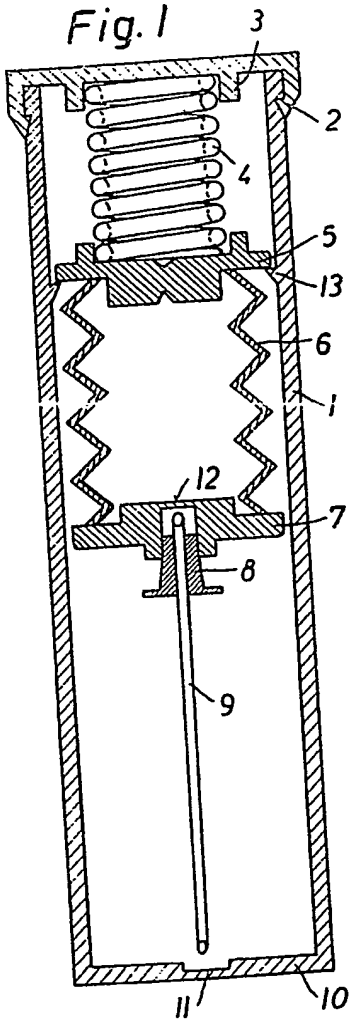


Fig. 2

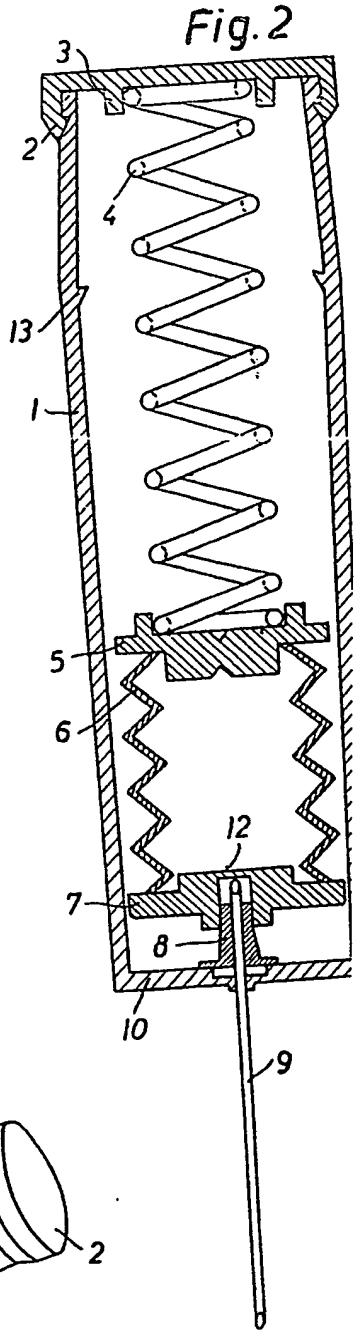
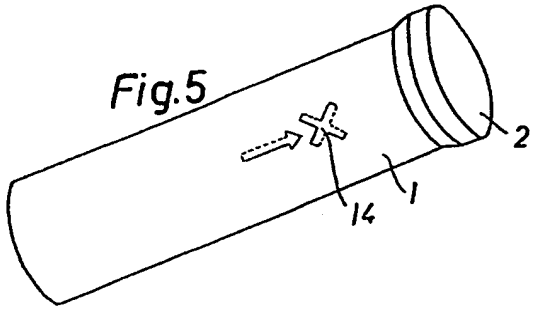


Fig. 5



906,574 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale.
SHEETS 1 & 2

7.2

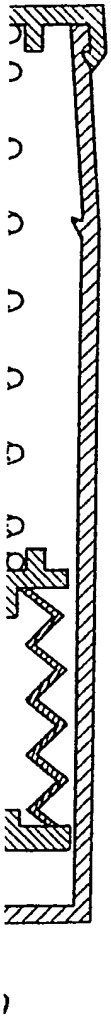


Fig. 3

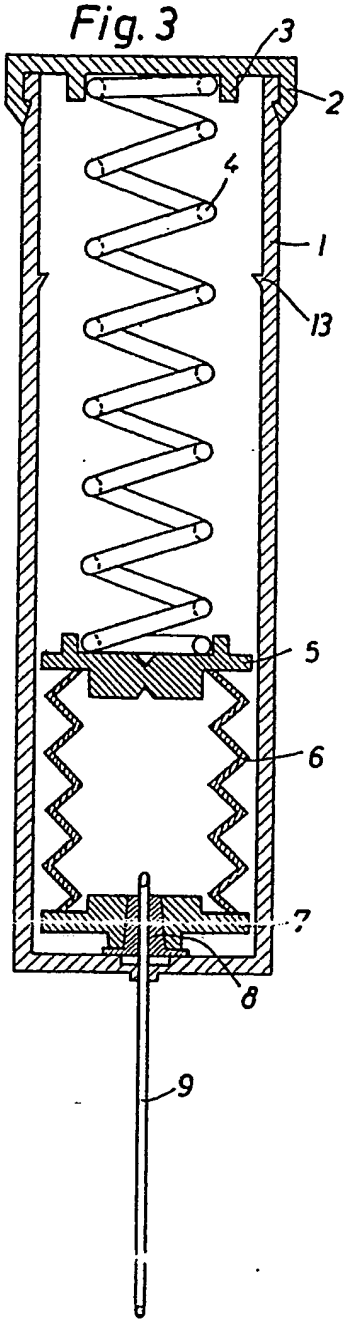
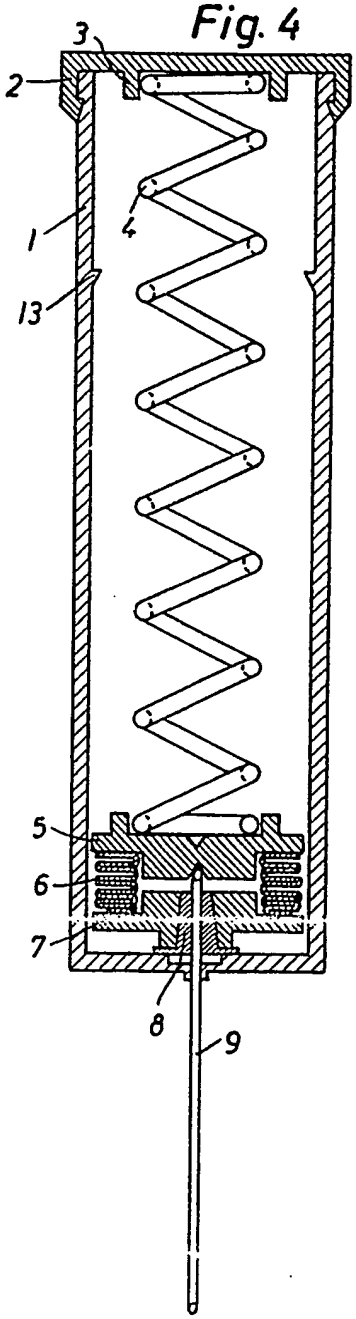


Fig. 4



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SHEETS 1 & 2

Fig. 1

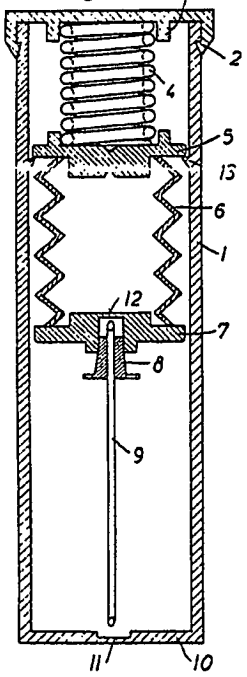

Fig. 2

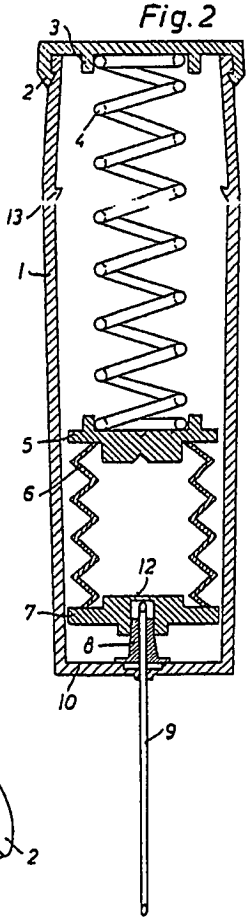

Fig. 3

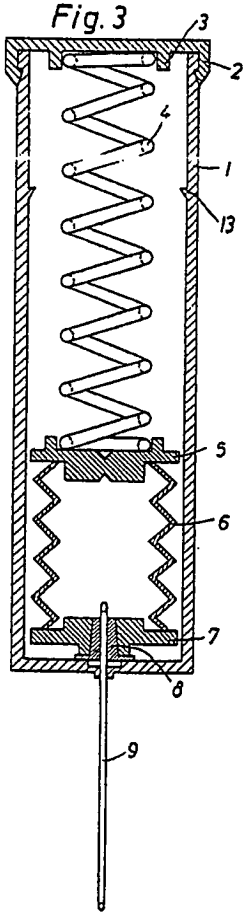

Fig. 4

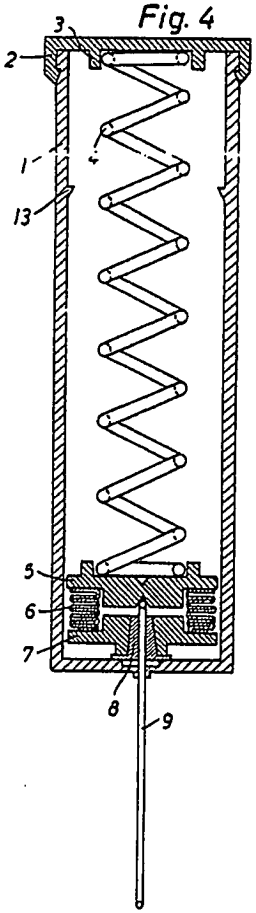

Fig. 5